

Burgers equation on graphs

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Abstract

Consider the classical inviscid Burgers equation $u_t + uu_x = 0$ in a monodimensional case. The basic interpretation of the system explains the motion of one wave, creation of shocks and rarefaction waves. However the theory does not capture the interaction of waves. Big waves eat smaller one. We can not obtain a passing through phenomenon between waves.

Our idea is to extend the monodimensional structure of the domain to a graph, giving the possibility for the solution to take different paths. This model is a motivation to introduce a theory of the Burgers equation on metric graphs. The crucial point is the behavior of solutions at vertexes, which must be suitably determined. I will show some interesting examples as well as key points of mathematical theory.

The talk is based on the results jointly with Aleksandra Puchalska (Warszawa).